

WHAT IS CLAIMED IS:

Subt. A1

1. A manufacturing method of an electron-emitting device comprising the steps of:
disposing an electrically conductive member having a second gap on a substrate; and
applying a voltage to said electrically conductive member while irradiating at least said second gap with an electron beam from electron emitting means disposed apart from said electrically conductive member in an atmosphere comprising a carbon compound.

2. A manufacturing method of an electron-emitting device comprising the steps of:
disposing first and second electrically conductive members on a substrate with a second gap interposed;
and
applying a voltage to said first and second electrically conductive members while irradiating at least said second gap with an electron beam from electron emitting means disposed apart from said electrically conductive members in an atmosphere comprising a carbon compound.

3. A manufacturing method of an electron-emitting device comprising the steps of:
disposing an electrically conductive member having a second gap on a substrate; and

irradiating at least said second gap with an electron beam from electron emitting means disposed apart from said electrically conductive member in an atmosphere comprising a carbon compound within a period 5 where a voltage is applied to said electrically conductive member.

4. A manufacturing method of an electron-emitting device comprising the steps of:

10 disposing first and second electrically conductive members on a substrate with a second gap interposed; and

15 irradiating at least said second gap with an electron beam from electron emitting means disposed apart from said electrically conductive members in an atmosphere comprising a carbon compound within a period where a voltage is applied to said first and second 20 electrically conductive members.

20 5. The manufacturing method of an electron-emitting device according to claim 1 or 3, wherein said electrically conductive member having said second gap is an electrically conductive film which connects a pair of electrodes to each other and has said second 25 gap in a portion of the electrically conductive film.

6. The manufacturing method of an

electron-emitting device according to claim 2 or 4, wherein said electrically conductive members are a pair of electrodes which are disposed with said second gap interposed.

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7. The manufacturing method of an electron-emitting device according to claim 2 or 4, wherein said electrically conductive members are a first electrically conductive film and a second electrically conductive film which are connected to a first and second electrodes apart disposed respectively and are disposed with said second gap interposed.

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8. The manufacturing method of an electron-emitting device according to any one of claims 1 through 4, wherein said applied voltage is a pulse like voltage.

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9. The manufacturing method of an electron-emitting device according to any one of claims 1 through 4, wherein said electron beam is at an energy level not lower than 1 keV and not higher than 20 keV.

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10. A manufacturing method of an electron source having a plurality of electron-emitting devices, wherein said electron-emitting device is manufactured by the manufacturing method according to any one of

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claims 1 through 4.

11. A manufacturing method of an image-forming apparatus having an electron source and an image forming member, wherein said electron source is manufactured by the manufacturing method according to claim 10.

10 12. An electron-emitting device having a carbon film, wherein said carbon film has specific resistance not higher than $0.001 \Omega\text{m}$.

15 13. An electron source having a plurality of electron-emitting devices, wherein said electron-emitting device is the electron-emitting device according to claim 12.

20 14. An image-forming apparatus having an electron source and an image forming member, wherein said electron source is the electron source according to claim 13.

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